SECTION 11
COST ESTIMATES

11.1 General

The purpose of this section is to provide guidance for the preparation of cost estimates for Comprehensive Everglades Restoration Plan (CERP) projects. Estimates are made for programming, cost control during design, evaluation of bids, control of negotiations, and to serve as a guide in establishing a schedule of payments. Often these estimates are also used to evaluate the reasonableness of the contractor's proposal for negotiated procurement contracts. Therefore, the estimates must be consistent with the best estimating practice of the construction industry and be current, accurate, and complete. They must reflect the anticipated cost to a governmental entity to perform the work by contract and include all reasonable costs, which a prudent, experienced, and well-equipped contractor might encounter.

11.2 References

All cost estimates for CERP projects shall conform to the provisions of the following publications:

ER 1110-1-1300, Engineering and Design Cost Engineering Policy and Requirements

ER 1110-2-1302, Engineering and Design Civil Works Cost Engineering

EI01D010, Engineering Instructions - Construction Cost Estimates

EP 1110-1-8, Volume 3, Current Edition - Construction Equipment Ownership and Operating Expense Schedule - Region III

EM 1110-2-1304 Civil Works Construction Cost Index System (CWCCIS)

MCACES User Manual, Volume I - Function and Capabilities & Volume II - Advanced Options

CERP Guidance Memorandum 005.00 "Total Project Cost Estimate Management"

11.3 General Requirements

The cost estimator shall obtain the current version of all software and applicable user manuals. Additionally, the cost estimator shall obtain the latest copy of aided cost engineering system (MCACES) along with the most current databases. MCACES software, unit price book and users manuals can be downloaded from: http://www.hnd.usace.army.mil/traces/.

11.4 Reviews

Whenever the cost estimator delegates, contracts, or assigns cost estimating responsibilities to another entity, a formalized submission and review process shall be established. The requirements for cost estimating thoroughness shall be no less than this document requires.

11.5 Cost Engineer Qualifications

The cost estimating staff shall consist of full-time cost estimating specialists. It is imperative that estimates be prepared by, and reviewed under the supervision of, personnel who are competent in construction cost estimating. The cost estimator must possess a working knowledge of construction and be capable of making professional determinations based on experience. If the responsible estimating entity determines the staff does not possess all these qualifications, a qualified firm shall be obtained for assistance whose specialty is cost estimating. In making this determination, the lead cost estimator shall consider the complexity of the project and the number and qualifications of his full-time cost estimating staff. In consideration and selection of a consulting firm, the lead cost estimator shall consider the firm's specialties, its ability to coordinate the estimates with the designers, and its previous experience in preparing cost estimates for a governmental entity. Estimates prepared by a consultant must be reviewed by the responsible estimating entity.

11.6 Cost Quality Management

The lead cost estimator(s) shall provide cost estimates in a timely manner. The quality or integrity of cost estimates shall not be compromised in order to meet completion deadlines or agency imposed budget requirements.

11.7 Methods Of Estimating

11.7.1 General

Except for preliminary screening, the method used to prepare estimates shall be the Micro-Computer Aided Cost Engineering System (MCACES). The following is a description of the required procedures for preparing cost estimates, as well as a listing of required information to be included in the estimate.

11.7.2 MCACES Estimation

Under the MCACES procedure, the estimate shall be prepared as explained in the MCACES User Manual. A MCACES prepared cost estimate is required for all but the preliminary screening cost estimates.

Labor

Labor costs in the MCACES estimate must be based on rates that include basic wages, overtime and holiday premium payments, and contractor's contributions for fringe benefits such as health and welfare, holiday and vacation pay, pension fund, and apprentice training. Estimated rates shall be those that the contractor shall be expected to pay. Estimation of wage rates shall consider prevailing rates actually being paid in the project area, as well as minimum rates that are in accordance with the requirements of the Davis-Bacon Act. The cost estimator must copy a MCACES labor rates database and adjust the rates for the local project area. Ultimately, the cost estimator is responsible for all wage rates used in the cost estimate.

Equipment

The cost estimator preparing the MCACES cost estimate must be familiar with applicable construction equipment and job-site conditions. The equipment selected shall conform to job conditions and be suitable for use with the materials that will exist on the project. The Equipment Ownership Schedule in EP1110-1-8 determines the hourly rates for equipment ownership and operating expenses. MCACES estimates shall utilize the EP1110-1-8 equipment database adjusted to region III (southeast United States).

Material

Materials are those items that are incorporated into and become part of the permanent structure. Supplies are those items which are used in construction but do not become physically incorporated into the project (i.e., concrete forms). Materials and supplies for the purpose of estimating can commonly be considered materials unless they need to be separated because of different tax rates. Costs may be obtained from the MCACES Unit Price Book (UPB), reference manuals, manufacturers' catalogs, quotes, or historical data. Quotes from manufacturers and suppliers shall be obtained for all specialty or not readily available materials and equipment to be furnished and installed by the contractor. When an item is relatively minor or not yet fully defined, it may be satisfactory to base pricing on data in estimating handbooks or the MCACES Database. In these cases, appropriate adjustments must be made to account for project conditions. For later stages or for significant items, material costs shall be based on verbal or written quotes obtained from manufacturers and suppliers, price lists, or recently acquired quotes. Specific current price quotes, from at least two sources if feasible shall be obtained for major items of permanent equipment and for significant, unusual, or nonstandard material items. Where quantities or unit costs will have only moderate impact, recently acquired quotes such as comparable items from other projects for are considered acceptable. Freight costs to the project site must be covered. Sales and other applicable taxes must be included in the estimate.

11.8 Estimate Requirements

11.8.1 General

The lead cost estimator shall prepare a professional quality construction cost estimate at each of the various stages of project development/design. Estimates must accurately reflect the scope and features of work shown in the design documents. The degree of detail must be commensurate with that represented by the plans, specifications, and design analyses. Where the design is not sufficiently complete to enable accurate definition of any portion of the work, appropriate allowances, assumptions, or contingency based on estimating experience and judgment, shall be made to cover work not yet fully defined. Costs must be broken down into priceable elements. All costs and quantities in the estimate must be supported. Unsupported lump sum pricing is not acceptable at any stage of design. The level of breakdown must be commensurate with detail available from the design information provided.

11.8.2 Cost Control

CERP features and projects may be subject to cost constraints based on the **Central And Southern Florida Project Comprehensive Review Study**. The cost estimator must be aware of cost constraints and provide the Project Delivery Team (PDT) information regarding the cost of current design compared with the baseline cost estimate. Throughout the development/design

process, close coordination between the designer and cost estimator must be exercised to achieve accurate cost control.

11.8.3 Indirect Cost

Cost estimates made at any point in the project cycle must include indirect costs. Indirect costs are those associated with a contractor, and usually included as overhead, profit, and bond. Indirect costs are those that cannot be attributed to a single task of construction work. Costs that can be applied to a particular item of work shall be considered a direct cost and are not to be included in indirect cost estimates. The overhead costs are usually divided into job office overhead (general conditions or field office overhead) and home office overhead (general and administrative). Home office overhead is typically based on a percentage. However, estimates of field office overhead shall be made with the same rigor and detail as the balance of the estimate. Other indirect costs that must be included in the estimate are profit and bond. All indirect costs are necessary for inclusion in all estimates. The one exception to the foregoing is the requirement that profit not be included in the cost estimate made for contract award.

11.8.4 Construction Contingency Cost

Contingency cost is the measure of project uncertainties on the estimated total project cost. The goal in contingency development is to identify the uncertainty associated with an item of work or a task, forecast the risk/cost relationship, and assign a value to this task that will limit the cost risk to an acceptable degree of confidence. This cost shall be most properly determined by a cost risk analysis. The cost risk analysis shall be accomplished as a joint analysis between the cost estimator, designer(s), and/or appropriate PDT` member. Contingencies may vary throughout the cost estimate and could have a significant impact on overall cost being high when lack of investigation data or design detail is associated with critical/high cost elements. The reasons for final contingency development and assignment that describe the potential for cost growth must be included in the cost estimate as part of the project narrative. Contingency allocations are specifically related to the project uncertainties and shall not be reduced without appropriate supporting justification. Normally, contingency costs are not part of the estimate for contract award.

11.8.5 Quantity Survey

Accuracy and completeness of the quantity survey (takeoff) is essential as it directly and critically affects the accuracy of the estimate. The takeoff shall be comprehensive and accurate to cover all work for the project. It shall be based on all facts that can be gathered from the available engineering and design data. Assumptions as to details that are beyond the level available at the current stage of design are often necessary to insure that total cost of the overall project work is covered. In such cases, statements and explanations of necessary assumptions shall be included so that, when design details become available, quantities can be reconciled. Quantity surveys must be planned to fit the pricing for the work involved. Surveys must be clearly documented in such manner that computations can be followed and verified by others. Relevant sketches shall be included. Quantity survey documentation must be preserved as backup data for the estimate.

11.8.6 Subcontract

The cost estimator must first determine those parts of the work that most likely shall be subcontracted. When work to be subcontracted has been determined, those items shall be

identified in the estimate. The appropriate subcontractor overhead and profit cost shall be applied to the subcontractor direct cost items in addition to the appropriate prime contractor overhead and profit. The cost estimator may utilize quotes for the expected subcontracted work when reviewed and verified as reasonable. In lieu of a quote, each task of the subcontract shall be priced as a direct cost with an appropriate rate of subcontractor's overhead and profit added. The total subcontract cost is considered a direct cost to the prime contractor.

11.8.7 Format

The MCACES software shall be employed in the production of all but preliminary screening estimates. The cost estimates shall be prepared in the Civil Works Breakdown Structure (CWBS). The MCACES is a multi-user software program used for the preparation of detailed construction cost estimates for civil works. The system includes a project database and supporting databases. The supporting databases include the Unit Price Book (UPB), crews, assemblies, labor rates, equipment ownership schedule cost, and models. The databases, which are described in the MCACES users manual, work in conjunction with each other to produce a detailed cost estimate.

Preliminary Screening Estimates

Prior to the evaluation of viable alternatives, a screening process may be used to review all the initial alternatives. The basis of costs may be historical, unit-based, parametric, published data, or developed. This estimate shall reflect the level of detail of the design provided. An effort must be made to ensure that the general magnitude of expected cost is reflected in the estimates and that the estimates are comparable. The estimate must be organized, legible and contain documentation that includes all the relevant cost information and assumptions. The screening process may become iterative and different levels of cost estimating detail may be appropriate at different levels of screening. The MCACES method is not a requirement of the preliminary screening estimates.

Estimates for Alternatives

The screening process will lead to a final list of typically two to five viable alternatives. A MCACES cost estimate is required for each alternative. Each estimate shall be made in the CWBS. The basis of costs may be historical, unit-based, parametric, published data, or developed. This estimate shall reflect the level of detail of the design provided. The MCACES estimate shall incorporate appropriate comments reflecting the methods of construction, assumptions, data available, and if applicable, derivation of production rates. These cost estimates will rely on incomplete project data. An estimate of cost risk or construction contingency must be incorporated into the estimate as a separate cost item. The non-construction cost and related contingency cost must be included in the alternative estimates. The cost estimator must make known the requirements for an estimate of real estate, pre-construction engineering and design, and construction management costs to be incorporated into the alternative estimate.

Tentatively Selected Plan and Selected Plan Estimates

After a review, comment and revision process, the tentatively selected plan will become the selected plan. The requirements for the cost estimate are the same for both plans. The engineering and design are generally refined to a sufficient level to allow for the estimating of equipment, labor, material, and production rates suitable for the project. This estimate shall be made in the CWBS to the sub feature level. This estimate includes construction contingencies of real estate

costs, pre-construction engineering and design, and construction supervision. The estimate is developed for a specific price date. The cost estimate shall reflect the level of design and shall contain appropriate comments and clear documentation reflecting the methods of construction, assumptions, data available, and if applicable, derivation of production rates. It is generally anticipated that this cost estimate will become the Baseline Cost Estimate (BCE).

Estimates During Pre-construction Engineering and Design

This phase consists of completing all detailed technical studies and designs needed to initiate construction. Cost estimates during this phase consist of revisions and refinements to previous estimates. The cost estimator must ensure that the BCE is used as a guide in managing the engineering and design process. The cost estimates are refined by use of more accurate cost data (specific supplier and material information), incorporation of site-specific data, and detailed quantities. As design progresses, the construction contingencies contained in the BCE are replaced by construction cost estimates of designed elements in the Current Working Estimate (CWE). Estimates of construction costs at the 100 percent design stage do not contain construction contingencies. This MCACES estimate shall include appropriate comments and clearly documented backup data shall be maintained.

Estimate for Contract Award

This estimate shall be a refinement of the CWE and shall be organized by bid item. This estimate represents the cost of performing the work within the time allocated by determining the necessary labor, equipment, and materials. The cost estimate shall be prepared as though the governmental entity were competing for the award. This estimate is the fair and reasonable cost to a governmental entity of a qualified and well-equipped contractor to perform the work described in the plans and specifications. This estimate does not include the prime contractor's profit. This estimate must be supported by material and quantity takeoff backup data and development computations. The estimate shall be comprised entirely of work tasks for which basic costs are detailed. The cost estimator is responsible for the complete cost estimate including amendments that might occur during the advertising period. This estimate shall not contain construction contingency cost. If bids are received where the closest responsive bid is out of the awardable range, the cost estimator shall promptly evaluate the cost estimate prepared for contract award. This includes a detailed review to determine if the cost estimate contains any omissions, discrepancies (i.e., errors in calculations), quantity takeoff errors, or errors in cost and pricing data. In addition, the reviewer shall further analyze any unusual conditions or circumstances that may affect or complicate the work.

11.9 Safeguarding Cost Estimates

The cost estimator shall manage the estimates in a discretionary manner. Access to each estimate and its contents shall be limited to those persons whose duties require knowledge of the estimate. Any request by the public for information and pricing in the estimate shall not be provided until coordination, verification of data, and the designated authority has given approvals. Access to the cost estimate made for contract award shall be limited to approved personnel. A list of the names of the individuals who have had access to the total amount of the cost estimate made for contract award shall be maintained. Typically, after the contract award, only the title page, signature page, and bid schedule are disclosed outside the governmental entity. The estimate for contract award backup data shall not be released since it contains sensitive cost data that are proprietary or might compromise cost estimates for future similar procurement.